

THE RHAPHIDOPHORIDAE (ORTHOPTERA) OF AUSTRALIA
PART 7. *PALLIDOTETTIX*, A NEW GENUS FROM THE
NULLARBOR PLAIN, SOUTH-WESTERN AUSTRALIA

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Synopsis

A new genus *Pallidotettix* is erected, and the new species *Pallidotettix nullarborensis*, n. sp. is described from limestone caves on the Nullarbor Plain in south-western Australia.

INTRODUCTION

The Nullarbor Plain is an area of Tertiary limestone about 75,000 square miles in extent, situated in south-western Australia. It extends from Ooldea and Colona on the east to Balladonia and Point Culver on the west, a distance of about 500 miles. To the north it is bounded by the Great Victoria Desert and to the south by the Great Australian Bight.

From 1957 onwards, a number of speleological expeditions have explored many of the caves which occur throughout the southern part of the Plain, and most of the material in this paper is based on the Rhaphidophoridae collected on these trips. These insects have been collected from at least 24 of the known caves, and observed in another three caves. Their distribution ranges from White Wells Cave, (N 14)* in the far east, to Gecko Cave (N 51) at the farthest western extremity of the limestone and as far north as Lynch Cave near the Transcontinental Railway (Text-fig. 1). Examination of these specimens has shown them to belong to a single species which is described here and placed in the new genus *Pallidotettix*, n.g. as *Pallidotettix nullarborensis*, n. sp. The species appears to be confined to the limits of the Nullarbor limestone.

P. nullarborensis is the palest Australian raphidophorid so far examined by the author. Sexual dimorphism is not strongly developed. It is absent from body size, antennae and number of linear spines on the hind femora. It is present in leg length, although not as pronounced as in some species of other genera. *P. nullarborensis* is one of the larger of the Australian Rhaphidophoridae. An adult male may reach a length of up to 17 cm. from the tip of its antennae to its hind tarsi. It is of comparable size to *Norotettix naracoortensis* Richards, but females are somewhat larger.

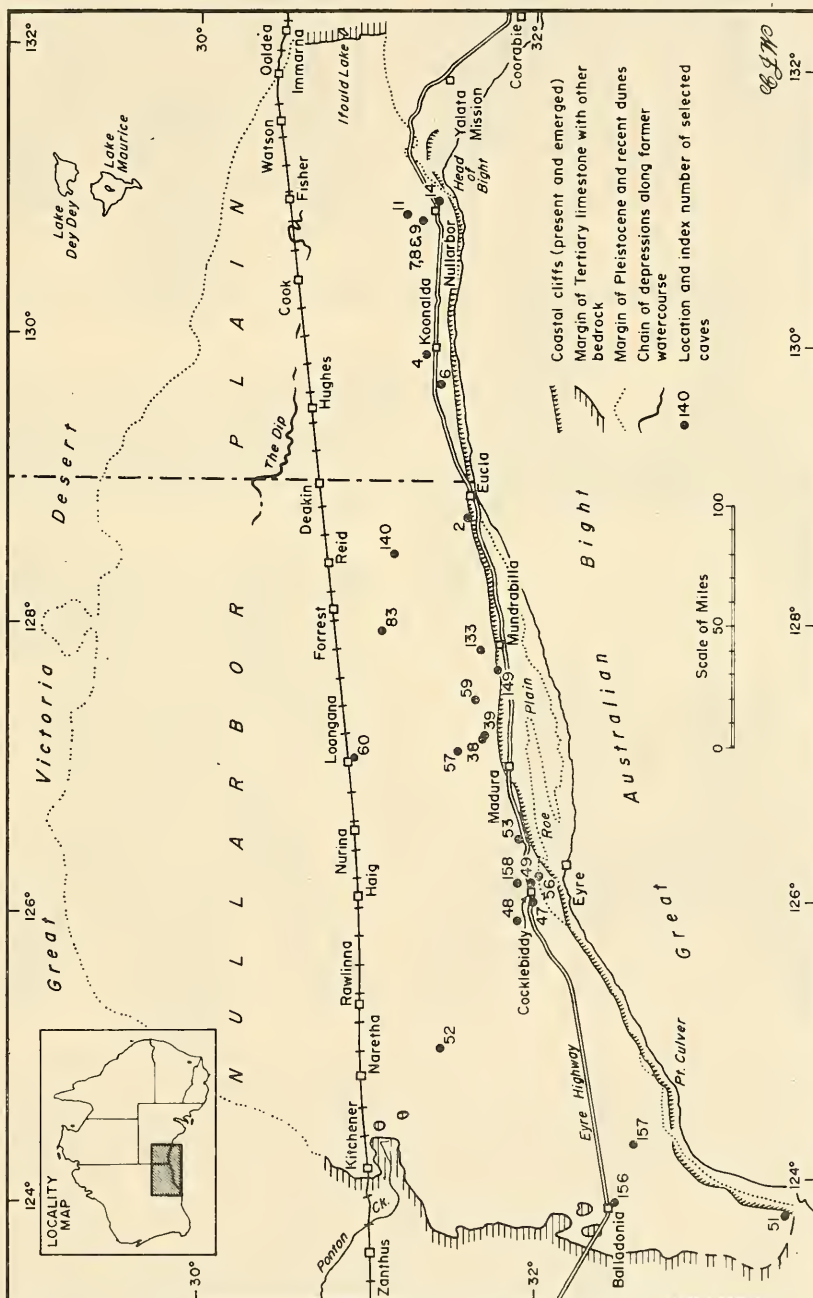
Pallidotettix does not show any close affinities with other Australian raphidophorid genera so far studied. The structure of the external genital plates in both sexes is quite distinctive.

Genus *PALLIDOTETTIX*, n. g.

Body sparsely clothed with short setae. Legs long and slender. Antennae very long and tapering, almost touching at their bases; scape about three times as large as pedicel, which is narrower than scape, but broader than

* The Nullarbor caves and dolines have been indexed by the Australian Speleological Federation, and the numbers are prefixed by the letter N. This system is used throughout this paper.

other segments; from fourth segment onwards segments subequal in length, although steadily decreasing in size; all segments thickly clothed with short setae. A single anterior, median ocellus only. Fastigium rising very abruptly, convex, grooved medianly and longitudinally. Fore coxae unarmed. All femora sulcate ventrally. Apical spines on femora, tibiae, first and second



Text-figure 1.—Map of the Nullarbor Plain showing approximate boundary of the Nullarbor Limestone, and the locations of the caves from which *Pallidotettix nullarborensis* has been collected.

proximal segments of hind tarsi constant in number. Fore femur bears two apical spines beneath, one prolateral and one retrolateral; fore tibiae bears four apical spines, one above and one beneath both prolaterally and retrolaterally; fore tarsus unarmed. Middle femur bears two apical spines beneath, one prolateral and one retrolateral; middle tibia bears four apical spines, one above and one beneath, both prolaterally and retrolaterally; middle tarsus unarmed. Hind femur bears two apical spines beneath, one prolateral and one retrolateral; hind tibia bears a pair of long apical spurs above, a pair of subapical spines above, a pair of shorter apical spurs beneath and a pair of subapical spines beneath, one from each pair being prolateral and the other retrolateral; two proximal segments of hind tarsus each bears two apical spines above, one prolateral and one retrolateral; other two segments unarmed. Subgenital plate of female trilobed distally and slightly keeled. Subgenital plate of male wider than long, distal margin emarginate and medianly produced into a small lobe.

Type species for the genus: PALLIDOTETTIX NULLARBORENSIS, n. sp.

PALLIDOTETTIX NULLARBORENSIS, n. sp.

(Text-fig. 2, Figs 1-6)

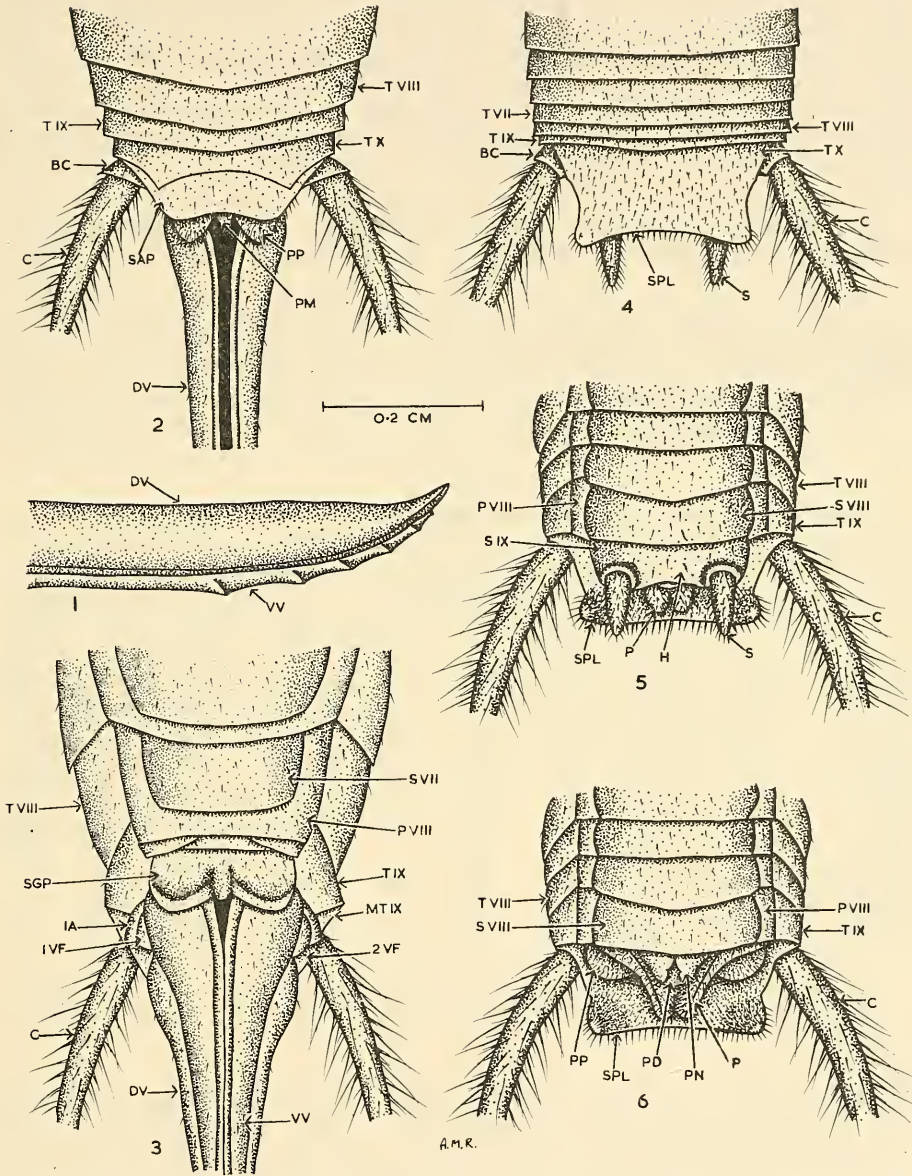
Colour.—Basic colour ochreous, with pronotum, mesonotum, metanotum and abdominal terga irregularly mottled with light brown; fore and middle femora and tibiae of all legs ochreous, hind femora ochreous with transverse light brown bands; tarsi ochreous; antennae ochreous; ovipositor light reddish-brown.

Body.—Length up to 16 mm. Body sparsely clothed with setae. Ovipositor 0·8 length of body; ventral valves armed distally with six teeth, gradually decreasing in size towards apex (Fig. 1). Antennae broken. Fastigium longer than high with base touching scapes of antennae. Maxillary palps with third and fourth segments subequal in length.

Antennae.—As in generic description. Third segment on dorsal aspect 2·25 as long as pedicel in female, and 1·75 as long in male; on ventral aspect 1·25 as long as pedicel in female, 1·1 as long in male. Sexual dimorphism absent. No spines on flagella of male or female.

Legs.—Fore and middle legs subequal in length, with hind leg 1·5 length of fore and middle legs. Sexual dimorphism slightly developed, fore, middle, and hind legs of female being 0·9 as long as male. Hind femora, all tibiae and proximal two segments of hind tarsi armed with variable numbers of linear spines (Table 1). No spines occur on fore or middle femora and tarsi. Apical spines constant in number as in generic description. Ratio of length of legs to length of body: Fore leg, male 3·3:1; female 2·5:1. Middle leg, male 3·1:1; female 2·4:1. Hind leg, male 4·8:1; female 3·7:1.

Genitalia. FEMALE: Suranal plate, Fig. 2 (SAP), concave laterally, distal margin emarginate and clothed with setae; rest of plate sparsely clothed with setae. Subgenital plate, Fig. 3 (SGP), 2·8 wider than long, distal margin trilobed, two lateral lobes rounded and thickened along margins, median lobe shorter and smaller than two lateral lobes and forming a keel two thirds length of plate; whole plate almost glabrous. MALE: Suranal plate, Fig. 4 (SPL), concave laterally, distal margin slightly emarginate with two latero-distal lobes; distal margin clothed with short setae, whole plate thickly clothed with setae, lateral lobes thickly clothed with setae on ventral surface of plate (Figs 5, 6). Subgenital plate, Fig. 5 (H), 3·8 wider than long, convex laterally; distal margin slightly emarginate, and medianly produced into a small lobe; whole plate sparsely clothed with



A.M.R.

Text-figure 2.—*Pallidotettix nullarborensis*, n. sp. 1, Distal portion of ovipositor showing teeth on ventral valve; 2, Female genitalia, dorsal view; 3, Female genitalia, ventral view; 4, Male genitalia, dorsal view; 5, Male genitalia, ventral view; 6, Male genitalia, ventral view, subgenital plate removed to expose structures beneath.

INDEX TO TEXT-FIGURE 2

BC, basal segment of cercus; C, cercus; DV, dorsal valve; H, subgenital plate, male; IA, intersegmental apodeme; MT IX, membrane of tergite IX; P, paramere; P VIII, pleurite VIII; PD, pseudosternite; PM, perianal membrane; PN, penis; S, stylus; S VII, S VIII, S IX—sternite VII, VIII, IX; SAP, suranal plate, female; SGP, subgenital plate, female; SPL, suranal plate, male; T VII, T VIII, T IX, T X—tergite VII, VIII, IX, X; 1 VF, first valvifer; 2 VF, second valvifer; VV, ventral valve.

setae. Two styli, Fig. 5 (S), broad, conical, thickly clothed with short setae, length of styli being 1.6 length of sternite IX (S IX). Parameres, Fig. 6 (P), elongate with rounded apex, subequal in width to length, thickly clothed with long and short setae. Pseudosternite, Fig. 6 (PD), twice as wide as long, with rounded apex. Penis, Fig. 6 (PN), two-lobed, each lobe subequal in width to length. Paraprocts, Fig. 6 (PP), twice as long as wide, partially hidden between suranal plate and parameres, clothed with setae.

Distribution.—Limestone caves on Nullarbor Plain, stretching from White Wells Cave, South Australia, to Gecko Cave, Western Australia.

Gecko Cave (N 51), 15 miles east of Mt. Ragged, south of Balladonia, W.A. (type locality), coll. D. C. Lowry 27/6/65; Lynch Cave (N 60), two miles south-east of Loongana, W.A., coll. D. C. Lowry 12/5/66, A. M. Richards 3/2/68; Pannikin Plain Cave (N 49), W.A., coll. D. C. Lowry 27/12/65; Tommy Graham's Cave (N 56), near Madura Pass, W.A., coll. D. C. Lowry 11/12/65; Horseshoe Cave (N 59), W.A., coll. D. C. Lowry

TABLE 1

Variability in number of linear spines on the legs of Pallidotettix nullarboresis, n.sp.

		Mean		Number Specimens		Standard Deviation		Range	
		L	R	L	R	L	R	L	R
Fore tibia	Pro.	4.0	3.9	25	25	0.3	0.4	3-5	3-5
	Inf.	4.0	3.9	25	25	0.2	0.3	3-4	3-4
Mid tibia	Pro.	3.6	3.6	25	25	0.5	0.5	3-4	3-4
	Inf.	3.6	3.7	25	25	0.5	0.5	3-4	3-4
Hind femur	Pro.	11.3	12.7	25	22	3.2	3.7	6-17	7-17
	Inf.	14.6	15.6	25	22	6.3	4.5	7-35	8-26
Hind tibia	Pro.	40.9	41.4	25	21	6.8	6.0	33-60	31-57
	Sup.	43.6	43.7	25	21	5.8	7.1	34-58	33-65
Hind tarsus	Pro.	3.9	3.8	25	20	1.1	1.0	2-6	2-6
	1 Sup.	3.8	3.8	25	20	1.0	0.9	2-6	2-6
Hind tarsus	Pro.	1.1	1.2	25	20	0.5	0.4	0-2	1-2
	2 Sup.	1.0	1.0	25	20	0.4	0.3	0-2	0-2

INDEX TO TABLE 1

L., left leg; Inf., inferior; Pro., prolateral; R., right leg; Retro., retrolateral; Sup., superior.

7/5/66; Blowhole (N 52), 32 miles south-west of Rawlinna, W.A., coll. D. C. Lowry 1/12/65; Moonera Tank Cave (N 53), W.A., coll. D. C. Lowry 14/5/66; Murra-el-elevyn Cave (N 47), W.A., coll. I. D. Wood 3/1/64, P. F. Aitken 3/1/64, E. Hamilton-Smith 28/12/64 and 17/1/65, D. C. Lowry 27/4/66, A. M. Richards 31/1/68; Cocklebidy Cave (N 48), W.A., coll. P. F. Aitken 3/1/65, D. C. Lowry 12/1/66, A. Baynes 24/3/67; Unnamed Cave (N 57), 20 miles from Madura Pass, W.A., coll. D. C. Lowry 11/12/65; Unnamed Cave (N 140), W.A., coll. D. C. Lowry 14/9/66; Unnamed Cave (N 149), W.A., coll. D. C. Lowry 21/9/66; Old Homestead Cave (N 83), W.A., coll. D. C. Lowry 2/9/66; Snake Pit Cave (133), Mundrabilla Station, W.A., coll. A. Baynes 27/3/67; Walpet Cave (N 38), W.A., coll. P. F. Aitken January, 1964; Joe's Cave (N 39), W.A., coll. P. F. Aitken January, 1964; Weebubbe Cave (N 2), W.A., coll. P. F. Aitken 3/1/60, G. S. Hunt 29/12/65; Murrawijinie No. 1 Cave (N 7), Nullarbor Station, S.A., coll. A. M. Richards 25/1/68; Murrawijinie No. 2 Cave (N 8), Nullarbor Station, S.A., coll. A. M.

Richards 25/1/68; Murrawijinie No. 3 Cave (N 9), Nullarbor Station, S.A., coll. C. Warner February, 1957, A. M. Richards 26/1/68; Koonalda Cave (N 4), S.A., coll. P. F. Aitken 7/1/59; A. Gallus January, 1968; White Wells Cave (N 14), S.A., coll. P. F. Aitken 12/1/60; Koomooloobookka Cave (N 6), Koonalda, S.A. coll. C. Warner February, 1957; New Cave (N 11), S.A., coll. N. Mollet January, 1955; Caves, Nullarbor, S.A., coll. J. Madden January, 1957; Cave, Nullarbor, S.A., coll. K. Renwick January, 1957; Cave, Nullarbor, coll. unknown January, 1952. Also observed by D. C. Lowry during 1966 in Unnamed Cave (N 156) near Balladonia, W.A., in Unnamed Cave (N 157) south-east of Balladonia, W.A.; and in Unnamed Cave (N 158) near Cockle-biddy, W.A.

Types.—Holotype male, allotype female, two paratypes, one male and one female, in National Insect Collection, C.S.I.R.O., Canberra. Two paratypes, one male and one female, in Western Australian Museum Collection, Perth; paratype, one female, in South Australian Museum Collection, Adelaide.

Material examined.—Fourteen adults, 120 nymphs.

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